

What is claimed is:

1. A memory module of an optionally portable electronic device having a processor which optionally provides an overall operation control of said electronic device, comprising:
  - 5 a fast non-volatile random access memory, responsive to a command/data signal provided by said processor, for providing a permanent storage of information before said command/data signal is provided, for executing a command contained in said command/data signal using said permanently stored information thus providing a direct communication between said fast non-volatile random access memory and the  
10 processor of said optionally portable electronic device.
2. The memory module of claim 1, wherein an interface between the processor and the fast non-volatile random access memory is a double data rate (DDR) type.
3. The memory module of claim 1, wherein the fast non-volatile random access memory provides a temporal storage of data contained in said command/data signal.
- 15 4. The memory module of claim 3, wherein said fast non-volatile random access memory comprises:
  - an information storage area for the permanent storage of said information; and
  - a temporal data storage area for the temporal storage of said data.
5. The memory module of claim 4, wherein said fast non-volatile random access  
20 memory further comprises:
  - at least one register for setting operating parameters of the fast non-volatile random access memory or protecting said data or said information during said execution.

6. The memory module of claim 5, wherein said operating parameters contain timings for a particular frequency, or frequency ranges with a corresponding core voltage range, or both said timings and said frequency ranges.

7. The memory module of claim 5, wherein said protecting contains a write protection.

8. The memory module of claim 1, wherein said information contains an application program for operating said electronic device.

9. The memory module of claim 1, further comprising:

a mass memory, for providing further information in response to a command/information signal; and

an application-specific integration circuit, responsive to said command/data signal, for providing said command/information signal.

10. The memory module of claim 9, wherein said further information is provided to said fast non-volatile random access memory.

11. The memory module of claim 10, wherein said fast non-volatile random access memory executes a further command contained in said command/data signal using said further information.

12. The memory module of claim 9, wherein an interface between the application-specific integration circuit and the fast non-volatile random access memory is a double data rate (DDR) type.

13. The memory module of claim 9, wherein a non-volatile random access memory-integrated circuit (NVRAM-IC) package contains the application-specific integration circuit, the mass memory and the fast non-volatile random access memory, or said non-volatile random access memory-integrated circuit (NVRAM-IC) package contains the application-specific integration circuit and the fast non-volatile random

access memory, or said non-volatile random access memory-integrated circuit (NVRAM-IC) package contains the mass memory and the fast non-volatile random access memory.

14. The memory module of claim 9, further comprising:

5 a dynamic random access memory, responsive to a command/data signal, for providing a storage of said further information, wherein said further information is provided or partially provided to the dynamic random access memory by the mass memory in response to said command/information signal.

15. The memory module of claim 14, wherein a non-volatile random access  
10 memory-integrated circuit (NVRAM-IC) package contains the application-specific integration circuit, the mass memory, the fast non-volatile random access memory and the dynamic random access memory, or said non-volatile random access memory-integrated circuit (NVRAM-IC) package contains the application-specific integration circuit and the fast non-volatile random access memory, or said non-volatile random  
15 access memory-integrated circuit (NVRAM-IC) package contains the mass memory, the dynamic random access memory and the fast non-volatile random access memory.

16. The memory module of claim 14, wherein said dynamic random access  
memory executes a still further command contained in said command/data signal  
20 using said further information.

17. The memory module of claim 14, wherein said portable electronic device comprises:

a removable mass memory, for providing, in response to a further  
command/information signal provided by the application-specific integration circuit,  
25 still further information to the fast non-volatile random access memory, or to the dynamic random access memory, or to both the fast non-volatile random access memory and to the dynamic random access memory.

18. The memory module of claim 17, wherein said fast non-volatile random access memory or the dynamic random access memory or both the fast non-volatile random access memory and the dynamic random access memory execute a further command or a still further command or both the further command and the still further  
5 command contained in said command/data signal using said further information or said still further information or both the further information and the still further information.

19. The memory module of claim 1, wherein said fast non-volatile random access memory is a magneto-resistive random access memory, a ferroelectric random access  
10 memory, or an Ovonic memory type.

20. An electronic device, comprising  
a processor, for providing a command/data signal and optionally for providing an overall operation control of said electronic device; and  
a fast non-volatile random access memory, responsive to the command/data  
15 signal, for providing a permanent storage of information before said command/data signal is provided, for executing a command contained in said command/data signal using said stored information.

21. The electronic device of claim 20, further comprising:  
a power and reset block, for resetting said processor and for resetting said fast  
20 non-volatile random access memory.

22. The electronic device of claim 20, wherein said electronic device is a portable electronic device, a mobile electronic device or a mobile phone.

23. A method for providing a direct communication between a memory module of an optionally portable electronic device and a processor of said electronic device, said  
25 processor optionally providing an overall operation control of said electronic device, comprising the steps of:

providing a command/data signal to a fast non-volatile random access memory of said memory module by said processor; and

executing by said fast non-volatile random access memory a command contained in said command/data signal using information permanently stored by said fast non-volatile random access memory before said command/data signal is provided, thus providing a direct communication between said fast non-volatile random access memory and the processor of said optionally portable electronic device.

24. The method of claim 23, further comprises the step of:

determining whether a further information is stored in a mass memory or a still further information is stored in a removable mass memory, wherein said further information or said still further information or both said further information and said still further information are needed to be accessed by the processor.

25. The method of claim 24, if said further information or said still further information or both said further information and said still further information are needed to be accessed by the processor, the method further comprises the step of:

determining by an application-specific integration circuit whether said fast non-volatile random access memory has enough of a storage area to accommodate said needed information.

26. The method of claim 25, wherein an interface between the application-specific integration circuit and the fast non-volatile random access memory is a double data rate (DDR) type.

27. The method of claim 25, if said fast non-volatile random access memory has enough of said storage area to accommodate said needed information, the method further comprises the steps of:

copying said needed information to said fast non-volatile random access memory in response to a command/information signal provided by the application-

specific integration circuit to a mass memory, or to a further command/information signal provided by the application-specific integration circuit to a removable mass memory or in response to both the command/information signal and the further command/information signal; and

5           executing by said fast non-volatile random access memory a further command contained in the command/data signal using said needed information copied to said fast non-volatile random access memory before said command/data signal is provided.

28.       The method of claim 25, if said fast non-volatile random access memory does  
10       not have enough of said storage area to accommodate said needed information, the method further comprises the steps of:

              copying said needed information partially to said fast non-volatile random access memory and partially to a dynamic random access memory in response to a command/information signal provided by the application-specific integration circuit  
15       to a mass memory, or to a further command/information signal provided by the application-specific integration circuit to a removable mass memory or in response to both the command/information signal and the further command/information signal; and

              executing a further command contained in the command/data signal by said  
20       fast non-volatile random access memory and executing a still further command also contained in the command/data signal by said dynamic random access memory using said needed information copied to said fast non-volatile random access memory and to said dynamic random access memory before said command/data signal is provided.

25       29.       The method of claim 23, wherein an interface between the processor and the fast non-volatile random access memory is a double data rate (DDR) type.

30. The method of claim 23, wherein said fast non-volatile random access memory is a magneto-resistive random access memory, a ferroelectric random access memory, or an Ovonic memory type.

31. The method of claim 23, wherein said electronic device is a portable electronic  
5 device, a mobile electronic device or a mobile phone.

32. A computer program product comprising: a computer readable storage  
structure embodying computer program code thereon for execution by a computer  
processor with said computer program code, characterized in that it includes  
instructions for performing all or selected steps of the method of claim 28 indicated as  
10 being performed by any component of the memory module or their combination  
thereof.